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 From: Thinh V. Nguyen, Reg. No. 42,034  
 Our Docket No.: 42390P7045D Number of pages 14 including this sheet.  
 Application No.: 09/874,666 Filing Date: 6/5/2001  
 Docket Due Date(s): 7/4/2005

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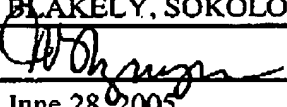
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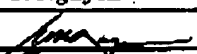
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<b>TRANSMITTAL FORM</b> <i>(to be used for all correspondence after initial filing)</i>		Application No.	09/874,666
		Filing Date	June 5, 2001
		First Named Inventor	Suresh Ramalingam
		Art Unit	2827
		Examiner Name	David E. Graybill
Total Number of Pages in This Submission	13	Attorney Docket Number	42390P7045D

ENCLOSURES (check all that apply)		
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SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT	
Firm or Individual name	Thinh V. Nguyen, Reg. No. 42,034 BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Signature	
Date	June 28, 2005

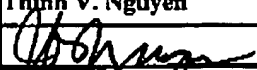
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<b>FEE TRANSMITTAL for FY 2005</b> <small>Patent fees are subject to annual revision.</small>		<i>Complete if Known</i>	
		Application Number	09/874,666
<input type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.		Filing Date	June 5, 2001
		First Named Inventor	Surcsh Ramalingam
<b>TOTAL AMOUNT OF PAYMENT</b> (\$)		Examiner Name	David E. Graybill
		Art Unit	2827
		Attorney Docket No.	42390P7045D

<b>METHOD OF PAYMENT</b> (check all that apply)	
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1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet.	
2053	130	2053	130	Non-English specification	
1251	120	2251	60	Extension for reply within first month	
1252	450	2252	225	Extension for reply within second month	
1253	1,020	2253	510	Extension for reply within third month	
1254	1,590	2254	795	Extension for reply within fourth month	
1255	2,160	2255	1,080	Extension for reply within fifth month	
1401	500	2401	250	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	
1403	1,000	2403	500	Request for oral hearing	
1451	1,510	2451	1,510	Petition to institute a public use proceeding	
1460	130	2460	130	Petitions to the Commissioner	
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<b>SUBMITTED BY</b>		<i>Complete (if applicable)</i>	
Name (Print/Type)	Thinh V. Nguyen	Registration No. (Attorney/Agent)	42,034
Signature		Telephone	(714) 557-3800
		Date	06/28/05

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# FEE TRANSMITTAL for FY 2005

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☐ Applicant claims small entity status. See 37 CFR 1.27.

TOTAL AMOUNT OF PAYMENT (\$)

*Complete if Known*

Application Number	09/874,666
Filing Date	June 5, 2001
First Named Inventor	Suresh Ramalingam
Examiner Name	David E. Graybill
Art Unit	2827
Attorney Docket No.	42390P7045D

## METHOD OF PAYMENT *(check all that apply)*

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## FEE CALCULATION

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
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1809	790	1809	395	Filing a submission after final rejection (37 CFR § 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR § 1.129(b))	
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SUBTOTAL (2)					(\$)

## SUBMITTED BY

*Complete (if applicable)*

Name (Print/Type)	Thinh V. Nguyen	Registration No. (Attorney/Agent)	42,034	Telephone	(714) 557-3800
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Docket No.: 042390.P7045D

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

<b>In re Application of:</b> <b>Suresh Ramalingam et al.</b> <b>Application No.: 09/874,666</b> <b>Filed: June 5, 2001</b> <b>For: A CONTROLLED COLLAPSE</b> <b>CHIP CONNECTION (C4) INTEGRATED</b> <b>CIRCUIT PACKAGE WHICH HAS TWO</b> <b>DISSIMILAR UNDERFILL MATERIALS</b>	<b>Examiner: David E. Graybill</b>  <b>Art Group: 2827</b>
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**REPLY BRIEF**

**Mail Stop Appeal Brief-Patents**  
**Commissioner for Patents**  
**P.O. Box 1450**  
**Alexandria, VA 22313-1450**

**Dear Sir:**

Applicants submit the following Reply Brief pursuant to 37 C.F.R. §41.41 for consideration by the Board of Patent Appeals and Interferences. Please charge any additional fees or credit any overpayment to our deposit Account No. 02-2666. A duplicate copy of the Fee Transmittal is enclosed for this purpose.

042390.P7045D  
App. No. 09/874,666

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TVN/tn

## REMARKS/COMMENTS

In response to the Examiner's Answer dated May 4, 2005, Applicants respectfully submit the Reply Brief.

### VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Applicants acknowledge that after the Appeal Brief was filed, the Examiner have withdrawn the following grounds of rejection:

1. Claims 7-14 and 31-35 under 35 U.S.C. §112, first paragraph;
2. Claims 7-14 and 31-35 under 35 U.S.C. §112, second paragraph;
3. Claims 7, 8, 10-14 and 31-35 under 35 U.S.C. §102(b) as being anticipated by Ameen (0340492); and,
4. Claims 7, 8, 10-14 and 31-35 under 35 U.S.C. §103(a) as being unpatentable over Ameen (03404902).

Therefore, the grounds of rejection to be reviewed on appeal are:

1. Claims 7-8, 10-14, and 31-35 stand rejected under 35 U.S.C. §102(b) as being unpatentable over Ameen in view of Applicant's admitted prior art (AAPA)
2. Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ameen in view of AAPA and further in view of Desai and Lewis.

### VII. ARGUMENTS

Claims 7-14 and 31-35 Are Not Obvious Over Ameen, In View Of Admitted Prior Art (for claims 7-8, 10-14, and 31-35), And Further In View Of Desai and Lewis (for claim 9).

The Examiner rejects claims 7, 8, 10-14, and 31-35 under 35 U.S.C. §103(a) as being unpatentable over Ameen in view of Applicant's admitted prior art (AAPA), and claim 9 as being unpatentable over Ameen in view of AAPA and further in view of Desai and Lewis. Applicants respectfully disagree and contend that the Examiner has not met the burden of establishing a *prima facie* case of obviousness.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP §2143, p. 2100-129 (8<sup>th</sup> Ed., rev. 2, May 2004). Applicants respectfully contend that there is no suggestion or motivation to combine their teachings and that no *prima facie* case of obviousness has been established.

1. Claims 7, 8, 10-14, and 31-35:

The Examiner rejected claims 7, 8, 10-14, and 31-35 under 35 U.S.C. 103(a) as being unpatentable over Ameen and in combination with Applicant's admitted prior art (AAPA). Applicants note that page 5 of the Examiner's Answer states that "claims 7, 8, 9-14 and 31-35 stand rejected". Applicants believe that the claim numbers should be 7, 8, 10-14, and 31-35. Applicants respectfully disagree and contend that the Examiner has not met the burden of establishing a *prima facie* case of obviousness.

Ameen and AAPA, taken alone or in combination, does not disclose, suggest, or render obvious (1) dispensing a first material to form an underfill which becomes attached to the integrated circuit and the substrate, and (2) dispensing a second material to form a circumferential fillet, the second material being different than the first material and having a lower adhesive property than the first material.

Ameen does not disclose any of the above elements as discussed above. AAPA merely discloses two types of materials, SEMICOAT 5230JP and SEMICOAT 122X. AAPA does not disclose, suggest or render obvious using these two materials as an underfill and a circumferential fillet having different adhesive properties.

Ameen discloses conformal sealing and interplanar encapsulation of electronic device structures. An integrated circuit (IC) chip 4 is mounted on a substrate 12 (Ameen, col. 6, lines 23-25; Figures 2 and 3). An overcoat polymeric material 44 is deposited to conformally coat the back face 14 of chip 4 and the top surface 20 of substrate 12 beyond the peripheral edge 46 of chip 4 (Ameen, col. 8, lines 14-20). To further enhance the environmental isolation of the structures, an undercoat or interplanar polymeric material is deposited to substantially fill the space 41 between the chip 4 and the substrate 12.

Ameen is well aware of adhesion properties of the liquid polymeric materials, but merely discloses that the undercoat material should have good adhesion to the wetted surfaces after curing (Ameen, col. 13, lines 10-11),. Ameen does not disclose or suggest that the second material has a lower adhesion property than the first material. In fact, Ameen discloses or suggests the opposite. Ameen discloses to use the same material for both overcoat and undercoat:

"... it may be desirable to [appropriately] adjust the properties of the solvent-free liquid overcoat polymeric material so that it will conformally coat the back of the electronic device, flow down the edge of the device onto the substrate surface and into the space between the electronic device and substrate. This will result in *a single deposition* of a substantially solvent-free liquid polymer which after curing forms a substantially void-free material conformally coating the back of the device, sealing the space between the device and the substrate at the periphery of the device, *and* substantially filling the space between the device and substrate." (Ameen, col. 13, lines 55-58; col. 14, lines 1-10, emphasis added)

As clearly seen from this paragraph, Ameen discloses using the same material for both the overcoat and the undercoat.

Ameen is well aware of adhesion properties of the liquid polymeric materials, but silent on the different adhesion properties between the overcoat and undercoat. This fact indicates that it was not obvious to Ameen or one skilled in the art that the second material has a lower adhesion property than the first material. Furthermore, Ameen discloses using the same material for both overcoat and undercoat in a single deposition of a substantially solvent-free liquid polymer. This further indicates that Ameen is teaching away from the claimed invention.

It is improper to combine references where the references teach away from their combination. In re Grasselli, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In re Mills, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990). Furthermore, although a



prior art device "may be capable of being modified to run the way the apparatus is claimed, there must be a suggestion or motivation in the reference to do so." In re Mills 916 F.2d at 682, 16 USPQ2d at 1432; In re Fitch, 972 F.2d 1260, 23 USPQ2d 1780 (Fed. Cir. 1992).

Here, not only Ameen does not disclose or suggest the second material having a lower adhesion property than the first material, but Ameen also teaches away from this. Therefore, it is improper to combine Ameen with any other references. The AAPA merely discloses the SEMICOAT series as exemplary materials to be used. AAPA does not disclose or suggest using the SEMICOAT series as first and second materials to form an underfill and a circumferential fillet, respectively, such that the second material is different than the first material and has a lower adhesive property. In fact, AAPA merely discloses using the material singly as an underfill for flip chip (Appeal Brief, Evidence Appendix, page 8 of Shin Etsu SEMICOAT Series).

In the Examiner's Answer, the Examiner admits that Ameen does not appear to explicitly disclose the second materials having a lower adhesive and adhesion property than the first material (Examiner's Answer, page 7, lines 15-17). The Examiner then goes on to discuss AAPA and states that "it would have been obvious to use the prior art SEMICOAT 5230JP polymeric epoxy underfill material as the polymeric and/or epoxy material of Ameen." (Examiner Answer, page 8, lines 16-22; page 9, lines 1-4). However, the issue is not whether SEMICOAT 5230J can be used as an underfill. The issue is whether the second material is different than the first material and has a lower adhesive property. The Examiner admits that Ameen does not disclose this aspect, but then fails to show that AAPA discloses or suggests the stated limitation.

2. Claim 9:

In the final Office Action, the Examiner rejected claim 9 under 35 U.S.C. 103(a) as being unpatentable over Ameen or the combination of Ameen and Applicant's admitted prior art ("AAPA") and further in combination with U.S Patent Application No. 6,166,434 issued to Desai ("Desai") and U.S Patent Application No. 6,020,579 issued to Lewis ("Lewis"). Applicants respectfully disagree and contend that the Examiner has not met the burden of establishing a *prima facie* case of obviousness.

Desai discloses a die clip assembly for semiconductor package. An underfill material is dispensed into the remaining space (or "gap") between the die and the substrate (Desai, col. 1, lines 65-67; col. 2, lines 1-5).

Lewis discloses a microwave applicator having a mechanical means for tuning. An applicator includes a conveyor belt passing through center openings. Such a system may be utilized to cure or dry coat solder masks, to die attach adhesives or to underfill (Lewis, col. 8, lines 12-21).

Ameen, AAPA, Desai, and Lewis, taken alone or in any combination, do not disclose, suggest, or render obvious (1) dispensing a first material to form an underfill which becomes attached to the integrated circuit and the substrate, (2) dispensing a second material to form a circumferential fillet, the second material being different than the first material and having a lower adhesive property than the first material, and (3) wherein the substrate moves within an oven while the first material flows between the integrated circuit and the substrate.

None of them discloses (1) and (2) as discussed above. Desai merely discloses the underfill material being dispensed between the die and substrate, not the substrate moving within an oven. Lewis merely discloses a system cure soldermask or to attach adhesives, or to underfill, not the substrate moving within an oven.

Accordingly, claims 7-14 and 31-35 are distinguishable over the cited prior art references.

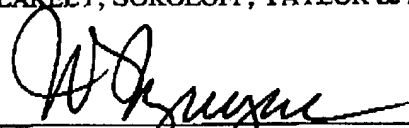
**VIII. CONCLUSION**

Applicants respectfully request that the Board enter a decision overturning the Examiner's rejection of all pending claims, and holding that the claims are not obvious by the prior art.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: June 28, 2005

  
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**IX. CLAIMS APPENDIX**

The claims of the present application which are involved in this appeal are as follows:

1.-6. (canceled)

7. (previously presented) A process for underfilling an integrated circuit that is mounted to a substrate, comprising:

dispensing a first material to form an underfill which becomes attached to the integrated circuit and the substrate; and,

dispensing a second material to form a circumferential fillet, the second material being different than the first material and having a lower adhesive property than the first material and becoming attached to the integrated circuit and the substrate.

8. (previously presented) The process as recited in claim 7, wherein the first material flows between the integrated circuit and the substrate.

9. (previously presented) The process as recited in claim 8, wherein the substrate moves within an oven while the first material flows between the integrated circuit and the substrate.

10. (previously presented) The process as recited in claim 7, wherein the second material is dispensed in a pattern which surrounds the first material.

11. (previously presented) A process for underfilling an integrated circuit that is mounted to a substrate comprising:

heating the substrate before a first material is dispensed;

dispensing the first material to form an underfill, the first material becoming attached to the integrated circuit and the substrate; and,

dispensing a second material to form a circumferential fillet, the second material being different than the first material and having a lower adhesive property than the first material and becoming attached to the integrated circuit and the substrate.

12. (previously presented) The process as recited in claim 11, further comprising heating the first material to a gel state.

13. (previously presented) The process as recited in claim 12, wherein the substrate is heated to a temperature that is greater than a temperature for heating said first material to said gel state.

14. (previously presented) The process as recited in claim 11, further comprising mounting the integrated circuit to the substrate with a solder bump before the first material is dispensed.

15.-30. (canceled)

31. (previously presented) A process for underfilling an integrated circuit that is mounted to a substrate comprising:

heating the substrate before a first material is dispensed;

dispensing the first material to form an underfill, the first material becoming attached to the integrated circuit and the substrate; and,

dispensing a second material around a periphery of the integrated circuit to form a circumferential fillet, the second material being different than the first material and having a lower adhesion property than the first material and becoming attached to the integrated circuit and the substrate.

32. (previously presented) The process as recited in claim 31, further comprising heating the first material to a gel state.

33. (previously presented) The process as recited in claim 32, wherein the substrate is heated to a temperature that is greater than a temperature for heating the first material to a gel state.

34. (previously presented) The process as recited in claim 33, wherein the first material is heated to a temperature ranging between 120 degrees Celsius to 145 degrees Celsius.

35. (previously presented) The process as recited in claim 31, wherein the dispensing of the second material is at a temperature ranting between 80 degrees Celsius and 120 degrees Celsius.